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1 I claim:

2 ~~1.~~ 1. A method comprising:

3 providing a glass work piece with an inner cut and an outer cut formed therein,
4 the portion of the work piece outside said outer cut constituting an outer waste piece, the
5 portion of said work piece inside said inner cut constituting an inner waste piece, the
6 portion of said work piece between said inner and outer cuts constituting a middle portion
7 of said work piece;
8 heating the outer waste piece to thereby cause said outer waste piece to expand
9 relative to the middle portion of the work piece;
10 separating the outer waste piece from the rest of the work piece;
11 heating the middle portion and cooling the inner waste piece; and
12 separating the inner waste piece from the middle portion.

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14 2. Method of claim 1 wherein said cuts are provided in said work piece prior
15 to said heating of the outer waste piece, said cuts extending through the entire thickness
16 of said work piece.

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18 3. Method of claim 1 wherein said inner and outer cuts are provided by
19 applying a laser to said work piece, said cuts extending through the entire thickness of
20 said work piece.

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22 4. Method of claim 1 wherein said heating the outer waste piece is
23 accomplished by placing said outer waste piece against a heating plate.

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5. Method of claim 4 further comprising:

gripping said inner waste piece with a vacuum grip after said heating of said
outer waste piece; and

raising said inner waste piece to thereby separate the inner waste piece and middle
portion from said outer waste piece.

6. Method of claim 1 wherein said heating the middle portion and cooling the
inner waste piece is accomplished by:

placing said middle portion proximate to but not in contact with a heating
element;

placing a cooling element against the inner waste piece; and

lifting the inner waste piece relative to the middle portion to thereby separate the
inner waste piece from the middle portion.

7. Method of claim 1 further comprising depositing a magnetic layer on the
middle portion after the middle portion has been separated from the inner and outer waste
pieces.

8. Method of claim 7 further comprising forming an underlayer between the
middle portion and the magnetic layer, and forming a protective overcoat over the
magnetic layer.

1 9. Method of claim 1 wherein said heating the outer waste piece comprises:
2 placing said outer waste piece against a heating element, said heating element
3 comprising one or more channels formed therein; and
4 applying a vacuum to said one or more channels to hold said outer waste piece
5 against said heating element.

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7 10. Method of claim 1 wherein said outer cut circumferentially surrounds said
8 middle portion.

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10 11. Method of claim 1 wherein the temperature difference between the middle
11 piece and the waste piece that said middle piece is being separated from during said
12 separating is greater than about 100 °C.

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14 12. Method of claim 1 wherein the temperature difference between the middle
15 piece and the waste piece that said middle piece is being separated from during said
16 separating is greater than about 125 °C.

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18 13. Method of claim 1 wherein the temperature difference between the middle
19 piece and the waste piece that said middle piece is being separated from during said
20 separating is greater than about 150 °C.

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22 14. Method of claim 1 wherein said middle piece is subjected to a temperature
23 cycle less than about 200 °C during said method.

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2 15. Method of claim 1 wherein said middle piece is subjected to a temperature
3 cycle less than about 150 °C during said method.

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5 16. Method of claim 1 wherein said ^{middle} ~~middle~~ piece is subjected to a temperature
6 cycle less than about 125 °C during said method.

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8 sub B 17. Method comprising:

9 providing a glass work piece that surrounds a waste piece;
10 heating the glass work piece without mechanically contacting the major surfaces
11 of said work piece;
12 cooling the waste piece, whereby the waste piece contracts relative to the work
13 piece, and the work piece expands relative to the waste piece; and
14 separating the work piece from the waste piece.

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16 18. Method of claim 17 wherein the temperature difference between the work
17 and waste pieces is greater than about 100 °C during said separating.

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19 19. Method of claim 17 wherein the temperature difference between the work
20 and waste pieces is greater than about 125 °C during said separating.

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22 20. Method of claim 17 wherein the temperature difference between the work
23 and waste pieces is greater than about 150 °C during said separating.

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2 21. Method of claim 17 wherein said work piece is subjected to a temperature
3 cycle less than about 200 °C during said method.

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5 22. Method of claim 17 wherein said work piece is subjected to a temperature
6 cycle less than about 150 °C during said method.

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8 23. Method of claim 17 wherein said work piece is subjected to a temperature
9 cycle less than about 125 °C during said method.

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11 5bA 24. Method comprising:

12 providing a work piece comprising a crack extending through the thickness of the
13 work piece, said crack having a closed shape such that the crack surrounds a first portion
14 of said work piece and is surrounded by a second portion of said work piece.

15 causing a temperature differential between said first and second portions such that
16 the first portion has a greater temperature than the second portion, thereby facilitating the
17 separation of the first and second portions.

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19 25. Method of claim 24 wherein said causing comprises heating said second
20 portion.

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22 26. Method of claim 24 wherein said causing comprises cooling said first
23 portion.

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2 27. Method of claim 24 wherein said causing comprises heating said second
3 portion and cooling said first portion.

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5 28. Method of claim 24 wherein said first portion is disk shaped.

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7 29. Method of claim 24 wherein said second portion is disk shaped.

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9 30. Method of claim 24 wherein the temperature difference between the work
10 and waste pieces is greater than about 100 °C.

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12 31. Method of claim 24 wherein the temperature difference between the work
13 and waste pieces is greater than about 125 °C.

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15 32 Method of claim 24 wherein the temperature difference between the work
16 and waste pieces is greater than about 150 °C.

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18 33. Method of claim 24 wherein said work piece is subjected to a temperature
19 cycle less than about 200 °C during said step of causing a temperature difference.

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21 34. Method of claim 24 wherein said work piece is subjected to a temperature
22 cycle less than about 150 °C during the step of causing a temperature difference.

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1 35. Method of claim 24 wherein said work piece is subjected to a temperature
2 cycle less than about 125 °C during the step of causing a temperature difference.

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4 ^{sub C4} 36. Method comprising:
5 providing a temperature difference between a product piece and a waste piece so
6 that said waste piece and product piece can be moved relative to one another;
7 moving one of said product piece or said waste piece so that said moved product
8 piece or waste piece is in proximity to a vacuum chuck; and
9 causing said vacuum chuck to hold said moved product piece or waste piece.

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11 37. Method of claim 36 wherein said vacuum chuck comprises two vacuum
12 channels that are displaced from one another so that said vacuum chuck can hold both the
13 product piece and the waste piece while the product and waste pieces are displaced
14 relative to one another.

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16 38. Method of claim 37 further comprising using said vacuum chuck to
17 transport the waste and product pieces after the waste and product pieces are displaced
18 from one another.

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20 39. Method of claim 36 wherein the product piece is a glass substrate.

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22 ^{sub B3} 40. Method comprising:
23 providing a work piece and a waste piece;

1 placing one of the waste piece or the product piece adjacent to a temperature
2 element, said temperature element changing the temperature of the adjacent waste piece
3 or product piece so that the waste piece and product pieces can be displaced relative to
4 one another; and

5 moving the temperature element so that the temperature element moves the
6 adjacent waste piece or product piece, whereby the waste and product pieces are
7 displaced relative to one another.

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9 41. Method of claim 40 wherein said placing comprises placing the waste
10 piece over the temperature element.

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12 42. Method of claim 40 wherein the product piece is a substrate.

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14 43. Method of claim 40 wherein the temperature element is a cooling element.

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16 44. Method of claim 40 wherein said moving the temperature element
17 comprises lifting the temperature element while the waste piece rests on the temperature
18 element.

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20 45. Method for heating a work piece with a heating element, said heating
21 element comprising channels extending to the surface of said heating element, said
22 method comprising:

1 placing a work piece against said heating element to thereby heat said work piece;
2 and
3 applying a vacuum to said channels to hold said work piece against said heating
4 element.

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6 46. Method of claim 45 wherein said vacuum results in a force that
7 substantially prevents said work piece from warping.

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9 47. Method of claim 45 wherein said work piece comprises a waste piece
10 surrounding a product piece, said heating of said work piece facilitating separating said
11 product piece from said waste piece.

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13 48. Apparatus comprising:
14 a hot plate for heating a work piece; and
15 a vacuum channel extending to a surface of said hot plate for holding said work
16 piece flush against said hot plate.

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18 49. Apparatus of claim 48 wherein said hot plate only heats a portion of said
19 work piece at the periphery of said work piece but not a centrally located portion of said
20 work piece.